

What is claimed is:

1. A flip-chip type semiconductor device comprising:
  - a semiconductor substrate;
  - a pad electrode formed on the semiconductor substrate;
  - 5 an insulating film formed on the entire surface of the semiconductor substrate, said insulating film having an opening above the pad electrode;
  - a wiring portion patterned on the pad electrode and the insulating film;
  - 10 an electrode formed on the wiring portion;
  - a metal bump formed on the electrode;
  - a support plate having holes each having a diameter larger than the diameter of the metal bump and formed at positions adjusted to the metal bumps, said support plate
  - 15 being arranged above the semiconductor substrate with an appropriate interval between said support plate and said semiconductor substrate such that the metal bump projects from said support plate; and
  - an insulating resin layer formed between the
  - 20 semiconductor substrate and the support plate, said electrode being buried in the insulating resin layer.
2. A flip-chip type semiconductor device according to claim 1, wherein the periphery of the joint portion between the metal bump and the electrode is covered with the
- 25 insulating resin layer.
3. A flip-chip type semiconductor device according to claim 1, wherein the support plate is made of a conductive material, an insulating film and a metal film are formed on

the support plate in the order named, and a metal bump, having a ground potential, of the metal bumps is connected to the metal film with a conductive adhesive agent.

4. A flip-chip type semiconductor device according to claim 1, wherein the support plate is made of an insulating material, a metal film is formed on the surface of the support plate, and a metal bump, having a ground potential, of the metal bumps is connected to the metal film with a conductive adhesive agent.

10 5. A flip-chip type semiconductor device according to claim 1, wherein the insulating resin layer contains at least one resin selected from the group consisting of an epoxy-based resin, a silicon-based resin, a polyimide-based resin, a polyolefin-based resin, a cyanate ester-based resin, 15 a phenol-based resin, a naphthalene-based resin, and a fluorene-based resin.

6. A flip-chip type semiconductor device according to claim 1, wherein the insulating film is made of a photosensitive material.

20 7. A flip-chip type semiconductor device according to claim 1, wherein the insulating film has a thermal decomposition temperature of not less than 200°C.

8. A method of manufacturing a flip-chip type semiconductor device comprising the steps of:

25 forming a pad electrode on a semiconductor substrate;  
forming an insulating film on the entire surface of the semiconductor substrate and removing the insulating film on the pad electrode to form an opening;

forming a metal thin film layer on the entire surface of the semiconductor substrate and patterning the metal thin film layer to form a wiring portion;

forming a resist film on the entire surface of the semiconductor substrate, patterning the resist film to remove the resist film on the wiring portion, and forming an opening to form an electrode in the opening;

forming a metal bump on the electrode;

arranging a support plate above the semiconductor substrate with an appropriate interval between said support plate and said semiconductor substrate, said support plate having holes each having a diameter larger than the diameter of the metal bump and formed at positions adjusted to the positions where the metal bump are arranged; and

injecting an insulating resin between the semiconductor substrate and the support plate.

9. A method of manufacturing a flip-chip type semiconductor device according to claim 8, wherein the support plate is made of a conductive material, and an insulating film and a metal film are formed on the support plate in the order named, and said method comprises burying a conductive adhesive agent into the hole of the support plate located at the metal bump, having the ground potential, of the metal bumps is held.

10. A method of manufacturing a flip-chip type semiconductor device according to claim 8, wherein the support plate is made of an insulating material, and a metal film is formed on the surface of the insulating material,

and said method comprises burying a conductive adhesive agent into a hole of the support plate located at a metal bump, having a ground potential, of the metal bumps.

11. A method of manufacturing a flip-chip type  
5 semiconductor device according to claim 8, wherein the support plate is arranged above the semiconductor substrate by arranging jigs each having an appropriate thickness at both ends of the semiconductor substrate and placing the support plate on said jigs.